



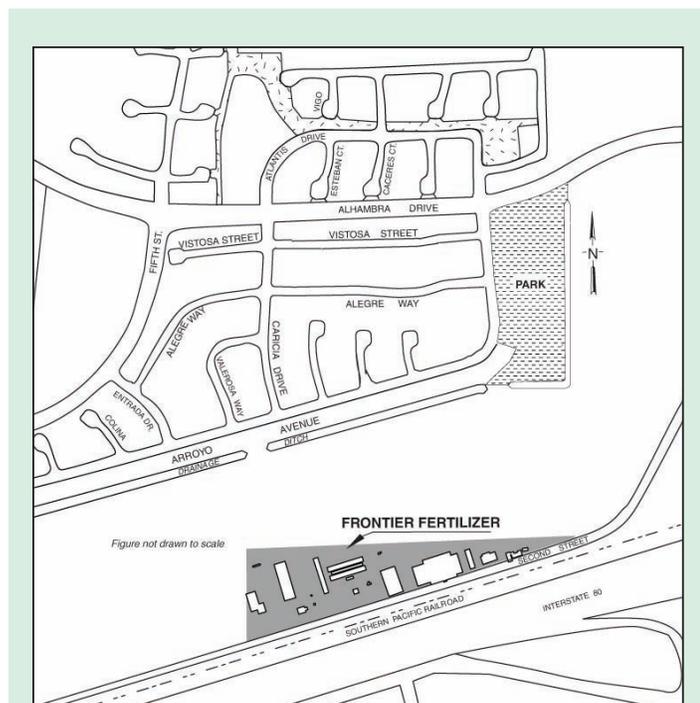
# Frontier Fertilizer Superfund Site

U.S. Environmental Protection Agency • Region 9 • San Francisco, CA • October 2009

## Open House and Community Meeting on Electrical Resistive Heating Treatment System Design, Start-Up and Operation

The United States Environmental Protection Agency (EPA) will begin treating pesticide contaminated soils and groundwater with in-place **Electrical Resistive Heating** (ERH) in January 2010 at the Frontier Fertilizer Superfund Site (Site) in Davis, California (see Figure below).

EPA will hold an open house and community meeting on Wednesday, October 28, 2009, to discuss the design, start-up, and operation of the ERH System.



**Figure 1:** Frontier Fertilizer Superfund Site

### Please Come to EPA's Open House, Community Meeting, or Both to Learn More!

Wednesday, October 28, 2009

**Open House**  
6 p.m. to 7 p.m.

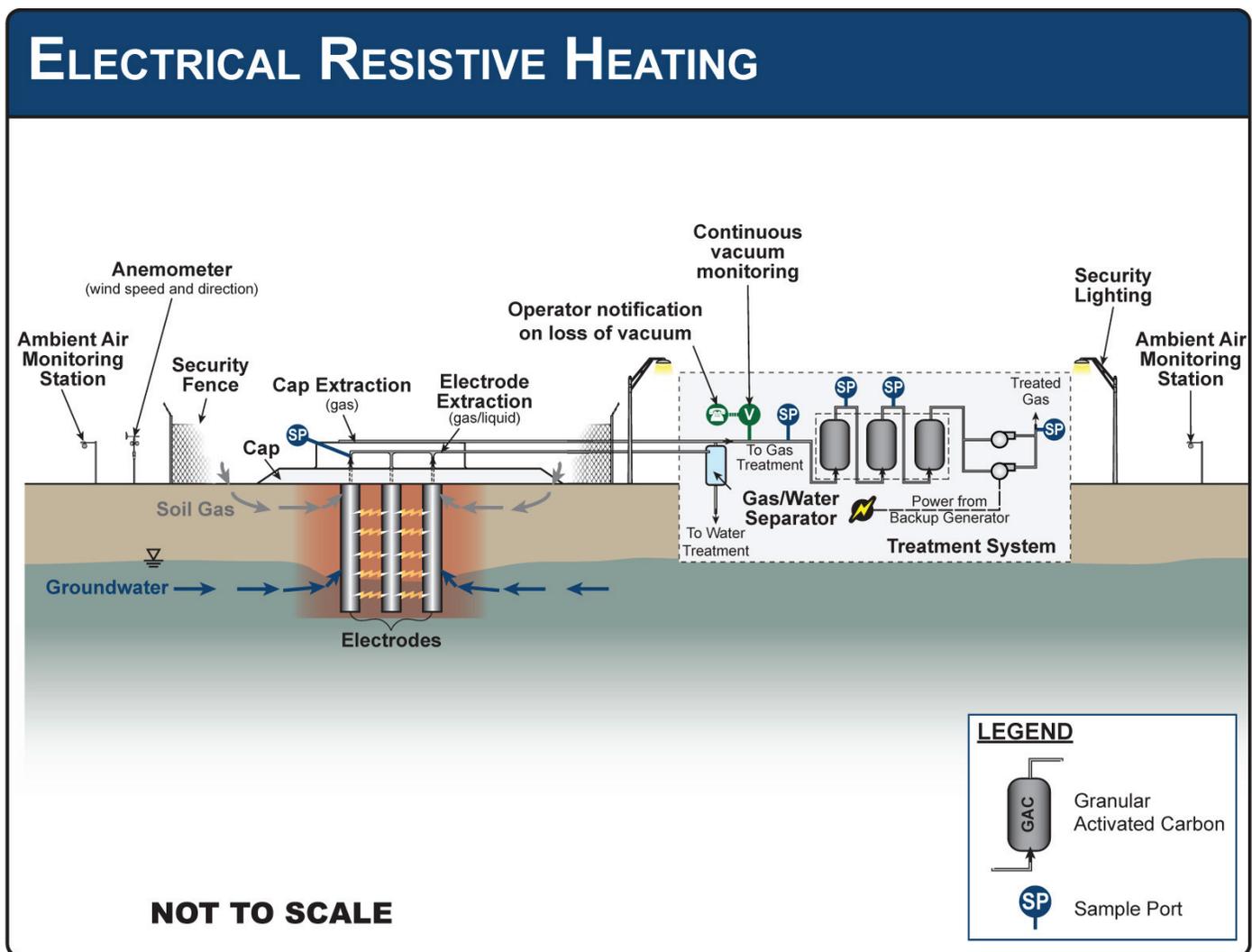
**Community Meeting**  
7 p.m. to 9 p.m.

**Davis Police Department**  
2600 5th Street  
Davis, CA 95618



The Open House will feature a poster board session with expert staff on hand to answer questions you may have about ERH technology and its application at the Site. The community meeting will consist of a technical presentation on the ERH treatment system design and operation followed by a question and answer period.

Directions from Interstate 80: 80 East, Exit Right on Mace Boulevard, left on Alhambra, left on 5th Street.



**Figure 2:** Electrical Resistive Heating System

## In-Place Electrical Resistive Heating

Since 1995, EPA has operated an on-site groundwater extraction and treatment system to clean up contaminated groundwater. The groundwater treatment system was found to be effective, but slow in removing contaminants and meeting Site cleanup levels.

Consequently, after an extensive review of technologies and a formal public comment period, EPA selected an additional treatment system in 2006, ERH, to reduce the time required to cleanup the Site for specific contaminants of concern including 1,2,3-Trichloropropane (TCP), 1,2-Dichloropropane (DCP), 1,2-Dibromo-3-chloropropane (DBCP), and Ethylene dibromide (EDB). ERH will simultaneously remove contaminant mass, source areas, from both soils and groundwater.

## How the ERH System Works

ERH works by passing an electrical current through electrodes placed into the ground. The resistance to current flow between the electrodes results in a rise in soil and groundwater temperature (i.e., electrical energy is converted into heat energy). The ERH construction and operation is described briefly below (see ERH Figure above).

Holes are first drilled in the area of contamination. Electrodes and monitoring equipment are placed into the holes and a cover is placed over the top of the surface area being heated (treated). A vacuum is applied throughout the heated zone using a network of vapor extraction wells to collect any soil gas. Once heating is started, the vacuum will be measured in wells, pipes, and treatment components to monitor the effectiveness of the soil gas control

system. Extracted gas is treated with granular activated carbon. Soil gas and ambient air (surrounding air) is collected and analyzed from locations around the ERH treatment area to confirm the system is operating correctly. Concentrations of COCs and other constituents in the collected gas are measured to evaluate ERH progress and the system's performance.

EPA will continue operating the groundwater extraction and treatment system after the heating is complete to ensure that cleanup levels are achieved in groundwater to drinking water standards.

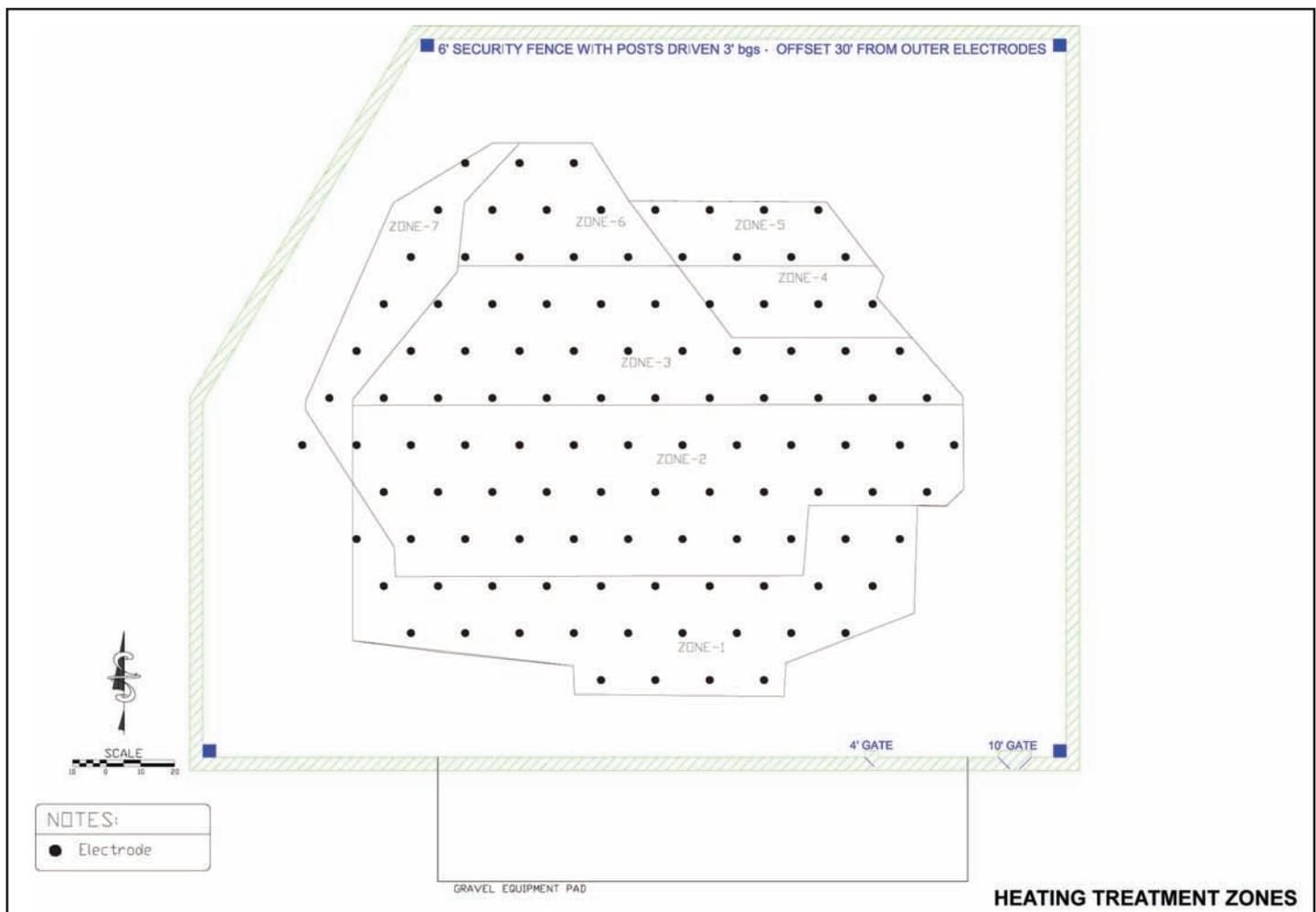
## What's Been Happening?

Installation of the ERH system started in Fall 2008 with the construction of 28 ERH **groundwater** and **soil gas wells**. These wells were installed to monitor ERH system effectiveness and/or control groundwater and soil gas movement.

In October and November 2008, soil samples were collected during well installation to better define the lateral and vertical extent of the pesticide contamination, from the former unlined disposal basins, within the ERH treatment zone (see Treatment Zone Figure below).

## What is Happening Now?

In September 2009, EPA began installing **electrodes** and additional soil gas and groundwater monitoring wells. EPA expects to finish installation by mid-November depending on weather conditions. Soil gas and groundwater wells will be collocated with the electrodes. Up to 27 **temperature monitoring wells** also will be installed to monitor soil and groundwater temperature within the treatment area. Starting in January 2010, the ERH system will begin operation and EPA anticipates that the heating and cleanup of soils and groundwater will be complete within 2 1/2 years. However, this anticipated cleanup timeframe is dependent upon both power availability and heating efficiencies.



**Figure 3:** Aerial view of ERH Treatment Zones

## Ensuring Community Safety

The ERH System includes many safeguards to ensure the safety of neighbors and site workers including the following:

- Fencing and sensors to restrict and detect unauthorized access into the heated area;
- A network of gas extraction wells to collect gas from the heated zone for treatment by granular activated carbon;
- A back-up generator to power the gas collection and treatment system should a power outage occur;
- Process gas and ambient air monitoring at key points throughout the process and around the Site;
- A cover over the top of the heating zone that will be heated near the ground surface.

## Design, Operation, and Notification Plans

The design, operation and notification plans currently being finalized are being developed to help coordinate and guide the safe and effective implementation and operation of the ERH system. All final documents will be available for review in the Information Repositories listed on the last page. A few of the major documents are described briefly below:

### Remedial Action Management Plan (RAMP)

The RAMP is the compilation of plans, specifications, and drawings necessary to safely and efficiently implement the ERH treatment system. The RAMP also includes procedures, methods, and requirements for implementing the ERH system.

## Glossary

**Electrical Resistive Heating (ERH):** Process using electrodes to heat soils and groundwater up to the boiling point of water (148° Fahrenheit) to liberate chemical contaminants for subsequent capture and treatment.

**Electrodes:** Steel bars installed in the ground to heat the soil and groundwater.

**Extraction wells:** Fiberglass pipes used to extract gases and liquids

**Groundwater:** Water found below ground surface, usually in transmissive, geologic strata called aquifers.

**Groundwater extraction and treatment system:** A system of extraction wells and carbon filters used to pump and treat (adsorb) chemical contaminants from contaminated groundwater.

**Groundwater Monitoring Wells:** A series of wells used to collect samples of groundwater or measure groundwater elevations.

**Soil Gas Monitoring Wells:** A series of wells used to collect samples of soil gas or measure gas pressure.

**Temperature Monitoring Wells:** Fiberglass piping with temperature sensors to monitor the heating system operation.



## Air Monitoring Plan

The Air Monitoring Plan details the methods that will be used to monitor gas control system performance during each phase of heating. For example, additional air monitoring is planned during system start-up to ensure the ERH system is working safely and effectively.

## Community Notification Plan

The Community Notification Plan describes how the community will be notified about any ERH system operational incidents. It establishes protocols for EPA and Emergency Responders to address community inquiries or concerns regarding the treatment system or Site. This Plan includes contact information for EPA staffs, regulatory agency representatives, and the local Fire and Police Department personnel who are available to provide resources to address community concerns or conditions arising from ERH activities. If you would like a copy of this Plan, please contact Jackie Lane, Community Involvement Coordinator at (415) 972-3236.

## Frontier Fertilizer Superfund Oversight Group Technical Assistance Grant

A Technical Assistance Grant (TAG) provides funding for a local eligible citizen group, the Frontier Fertilizer Superfund Oversight Group (FFSOG), to hire a technical advisor (TA). The FFSOG and TA participate in monthly calls and regular meetings with EPA and the State of California and discuss and provide comments on technical documents and cleanup activities. EPA considers FFSOG and TA input, and all other community input, before making its cleanup decisions. The FFSOG President, Pam Nieberg, is available to help community members understand technical information. She can be reached at (530) 756-6856.

## Target Update

In 2008, EPA signed an Administrative Order of Consent with Target, Inc. to ensure that EPA's groundwater monitoring wells were removed and reinstalled correctly. Eight groundwater monitoring wells were removed and fifteen new wells were added.

Additional soil gas and shallow groundwater sampling occurred during April and May of 2009. Soil gas and shallow groundwater samples were collected in the Target development area and soil gas samples were collected at locations where Site COCs, including 1,2,3-Trichloropropane (TCP), were detected in shallow groundwater. TCP was subsequently detected in one of the eight shallow

groundwater samples collected; however, it was not detected in any of the 55 soil gas samples collected from 26 locations. The TCP groundwater sample detection of 0.0029 micrograms/liter, was below the California Drinking Water Action Level of 0.005 micrograms/liter. EPA will work with the State of California and the Frontier Fertilizer Superfund Oversight Group (FFSOG) to plan any follow-up investigations.

The drinking water supply for the City of Davis, including the Target store, comes from a deeper groundwater aquifer. No contaminants above drinking water standards have been detected in this drinking water aquifer.

# Open House and Community Meeting on Electrical Resistive Heating Treatment System Design, Start-Up and Operation

## Contact Information

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**U.S. EPA, Region 9**

75 Hawthorne Street  
San Francisco, CA 94105  
Toll Free (800) 231-3075 (message line)  
Toll Free 24 hour Emergency Line (800) 300-2193

**Frontier Fertilizer Superfund Oversight Group**

Pam Nieberg, President  
(530) 756-6856  
*pnieberg@dcn.davis.ca.us*

## Information Repositories

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The information repositories below house Site documents available for public review. EPA also has a web page for the Site at <http://www.epa.gov/region09/frontierfertilizer/>

**Yolo County Library, Davis Branch**

315 East 14<sup>th</sup> Street  
Davis, CA 95616  
(530) 757-5593

**Shields Library**

Government Documents Department  
University of California  
Davis, CA 95616  
(530) 752-6561

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United States Environmental Protection Agency, Region 9  
75 Hawthorne Street (SFD-6-3)  
San Francisco, CA 94105  
Attn: Jackie Lane (Frontier 10/09)

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